TABLE OF CONTENTS

T	D	Darre	Descer	
I.	POWER	POINT	PRESENTA	ATION

П	T.		TO O
	- 4	٧кі	FS

- 13 Soil Analytical Results, Existing SWMUs/AOCs,
 Data Evaluation/Phase II Recommendation Summary
- 14 Groundwater Data Evaluation Summary Recommended Phase II Activities
- 15 Additional SWMUs/AOCs South Plant Recommended Phase II Activities

III. FIGURES

- 1 Site Location Map
- 2 Detailed Site Plan
- 2A Detailed Site Plan North Plant
- 3 RFI Soil Sampling Locations/Results SWMU 1 – North Phosphoric Acid Storage Pond
- 4 RFI Soil Sampling Locations/Results SWMU 5 – Spar Building Storage Area
- 5 RFI Soil Sampling Locations/Results SWMU 16 – Past Landfill Area IV
- 6 RFI Soil Sampling Locations/Results SWMUs 21, 22, and 30 – Past Landfill Area IX, Past Landfill Area X and Former East and West Lagoons
- 7 RFI Soil Sampling Locations/Results SWMU 23 – Past Landfill Area XI
- 8 RFI Soil Sampling Locations/Results SWMU 27 – Environmental Protection Station
- 9 RFI Soil Sampling Locations/Results SWMU 28 – Hypo Muds Accumulation
- 10 RFI Soil Sampling Locations/Results AOC 1 – Tank 15 Spill Area
- 11 RFI Soil Sampling Locations/Results
 - AOC 3 Pesticide Investigation/Remediation Areas
- 12 RFI Soil Sampling Locations/Results AOC 4 – Conrail Fuel Spill Area
- 13 Geologic Cross Section A-A'
- 14 Groundwater Contour Map May 2003
- 15 Groundwater Contour Map July 2003 (B-size)
- 15B Groundwater Contour Map Honeywell Groundwater Monitoring Well Data July 2003 (B-size)

i

- 16 Arsenic Concentrations Along Delaware River
- 18 South Plant Additional SWMUs/AOCs

IV. APPENDIX A: BORING LOGS AND WELL INSTALLATION DETAILS



360/L1-TOC-B

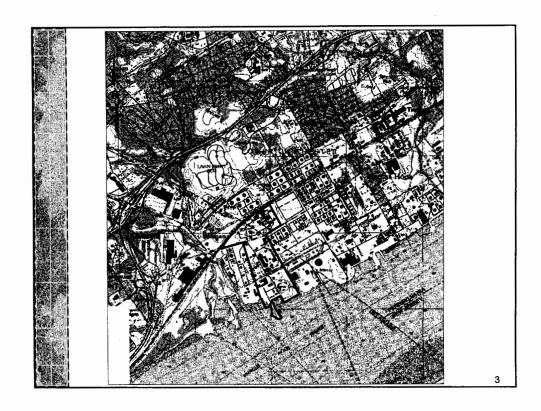
Meeting Presentation
RCRA Corrective Action
RFI Phase I Results and Phase II
Recommendations
General Chemical Corporation
Delaware Valley Facility

USEPA Region III/DNREC November 7, 2003

1

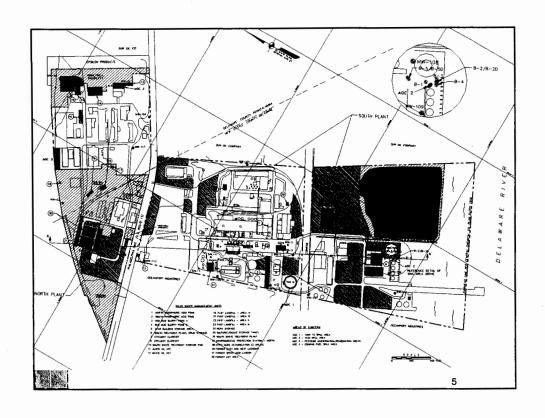
Presentation Summary

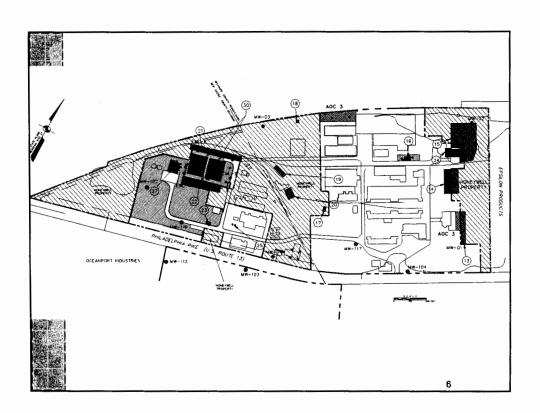
- ★ RFI Work Plan Objectives
- **₩ RFI Phase I Activities**
- **X** Soil Data Evaluation
- ₩ Groundwater Data Evaluation
- * Additional South Plant AOCs/SWMUs
- ★ Phase II Summary of Activities



RFI Work Plan Objectives

- ★ Characterize the potential exposure pathway associated with the industrial worker
- ★ Evaluate groundwater along the southern property boundary and in general interior areas of the Facility to determine potential impact on human and ecological receptors associated with the Delaware River





RFI Phase I Activities

- ★ Well Installation November/December 2002
- **★** Groundwater Sampling (two events)
 - ◆February 2003
 - ◆July 2003

7

Soil Sampling Activities

- ★ Collection of surface soil samples at designated SWMUs/AOCs
- ★ Test Pit activities associated with SWMUs 16 and 23
- ★ Split soil samples with USEPA contractor at SWMUs 16 and 23
- ★ Total Organic Carbon samples from 17 borings



- # SWMU 1 2 samples
- # SWMU 5 4 samples
- **※ SWMU 16** − 9 samples
- **※ SWMU 21, 22 and 30**
 - 11 samples
- **※ SWMU 23** − 7 samples

- **※ SWMU 27** − 5 samples
- **★ SWMU 28** − 3 samples
- # **AOC** 1 2 samples
- \times **AOC 3** 7 samples
- # **AOC 4** 2 samples
- **★ Total** 52 samples

9

Well Installation Activities

- ★ Installation of 17 groundwater monitoring wells;
 North Plant (4 wells) and South Plant (13 wells)
- ** Characterization of the uppermost water-bearing zone
- ★ Continuous soil sampling from ground surface to water table
- ★ Well development activities at new and existing wells
- ₩ Well head repair to Wells SAL 3, EWL-5 and EWL-6

Groundwater Sampling

- ★ Initial sampling event implemented week of February 3, 2003
- ★Collection of additional round of groundwater levels in May 2003
- ★ Second sampling event implemented the week of July 7, 2003

11

Approved Modifications to Work Plan – Soil

- ★ Soil samples were not collected at SWMU

 10 due to the presence of intact concrete
 throughout the SWMU area
- ★ Soil samples were not collected from SWMU 28-south due to the presence of asphalt paving in this area

Approved Modifications to Work Plan - Groundwater

- ** Total and dissolved metals analyses were collected at all locations due to turbidity levels (both events)
- ★ Existing wells B-1, B-3, B-4 and B-5 were resampled during the second event to confirm metals results from first event
- ★ Monitoring Well B-5D was resampled for metals and the remaining Appendix IX suite to evaluate vertical extent of constituents

13

Approved Modification to Work Plan - Groundwater

- ★ Existing Wells SAL-1, SAL-3, EWL-5, EWL-6 and EWL-8 were resampled to confirm first sampling event results
- ★ Dioxin/Furan analyses were performed at EWL-6 to confirm first sampling event results
- ★ Dioxin/Furan analyses were performed at MW-102 and MW-116 during the second event to evaluate lateral extent relative to EWL-6

Soil Data Evaluation

- ★ Comparison to USEPA Region III Industrial RBC's
- ★ Acceptable risk range of 10⁻⁴ to 10⁻⁶
- * Inorganic constituent of potential concern arsenic
- ★ Organic constituents of potential concern pesticides (North Plant)

15

Soil Data Evaluation - Arsenic

- **★ Comparison to USEPA Region III Industrial** RBC's (10⁻⁶) − **1.9 ppm**
- **★ Comparison to USEPA Region III Industrial** RBC's (10⁻⁵) − **19 ppm**
- ** Comparison to Accepted Cleanup Levels at other sites

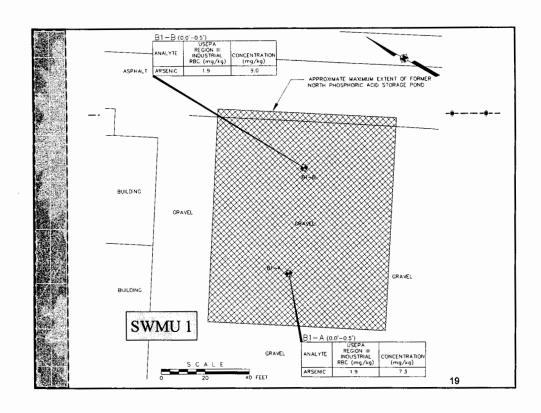
USEPA Region III/DNREC Accepted Arsenic Cleanup Levels

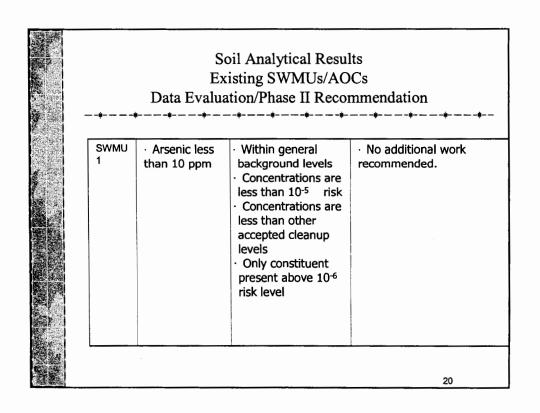
- **** 104 ppm** -Sharon Transformer Plant, Sharon, PA (CERCLA 2000)
- **38 ppm** − Halby Chemical Co., New Castle, DE (CERCLA, −1998)
- **38 ppm** − Potts Property Site, Wilmington, DE (DNREC − 1999)
- **※ 14 ppm** − Local Background (Potts/Halby)
- **# 1 to 10 ppm** − Typical DE Background

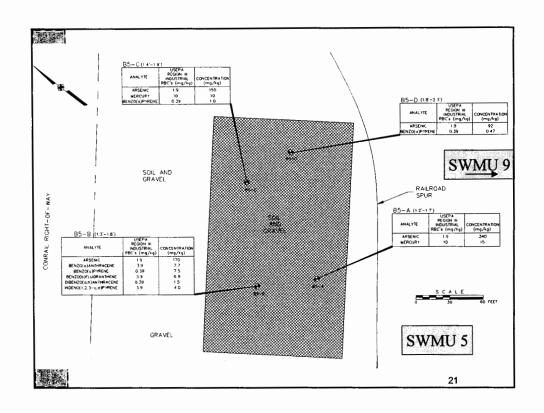
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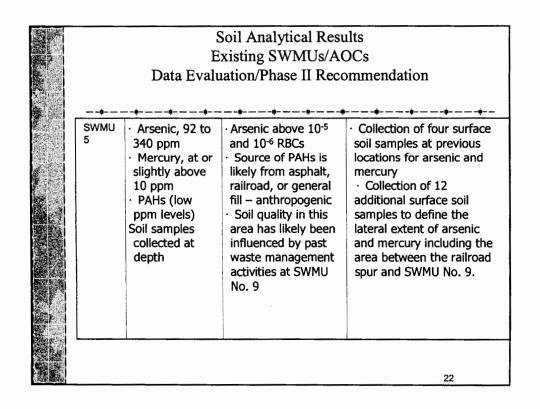
Soil Data Evaluation - Pesticide

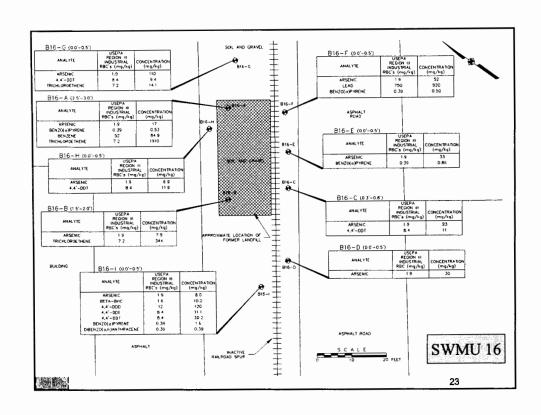
- ★ Comparison to USEPA Region III Industrial RBC's (10⁻⁶)
- ★ Comparison to USEPA Region III Industrial RBC's (10⁻⁵)
- * Working with Honeywell to develop appropriate cleanup levels

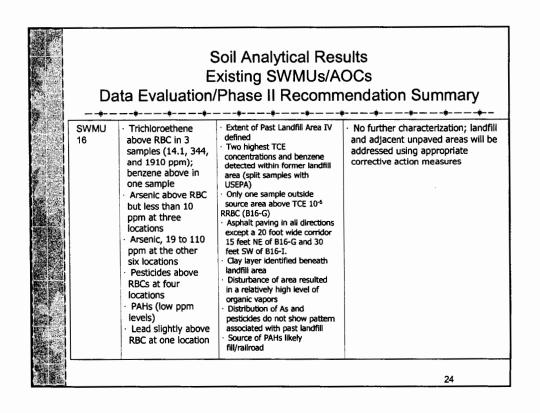


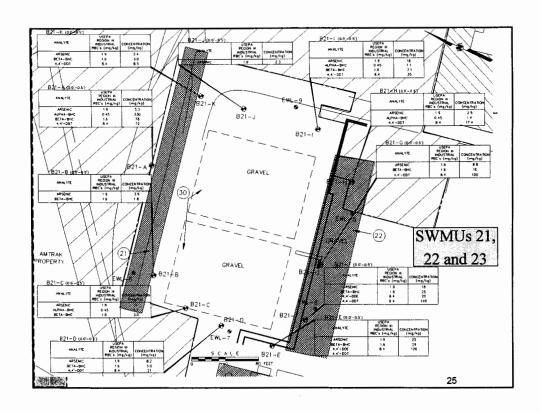


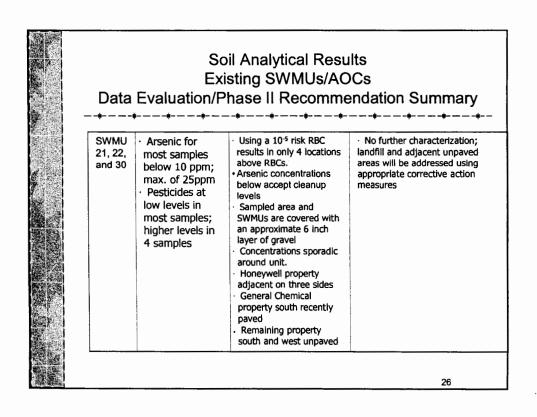


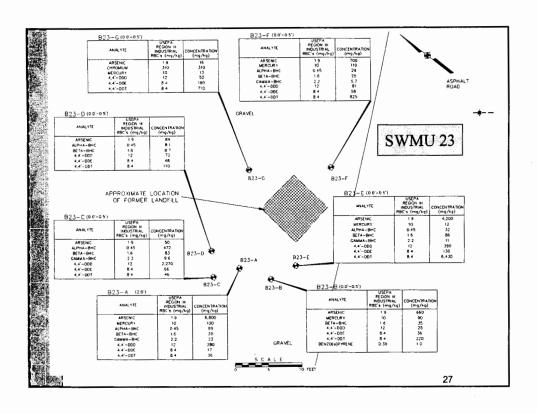


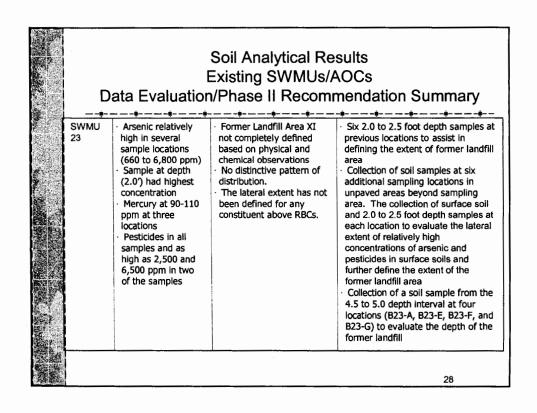


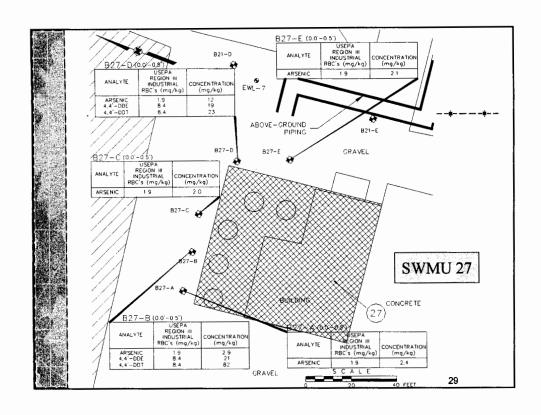


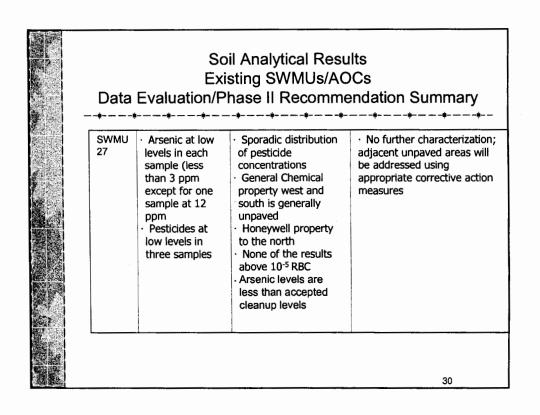


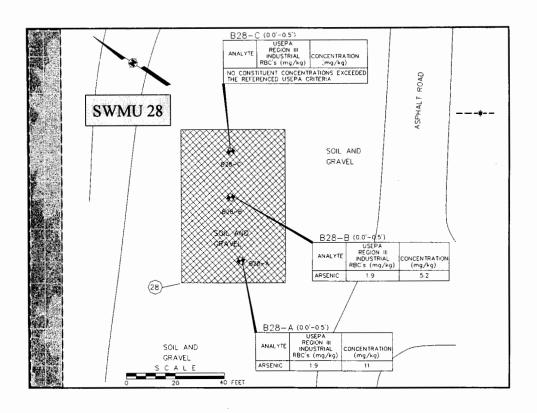


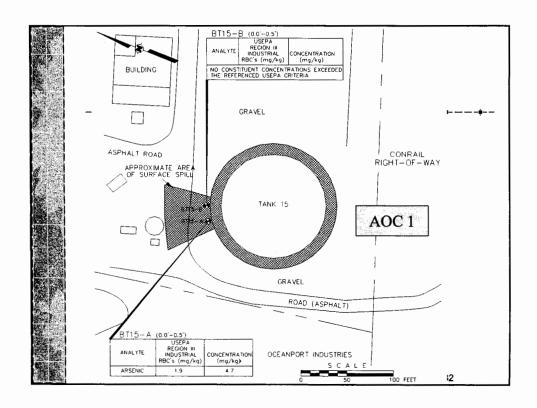




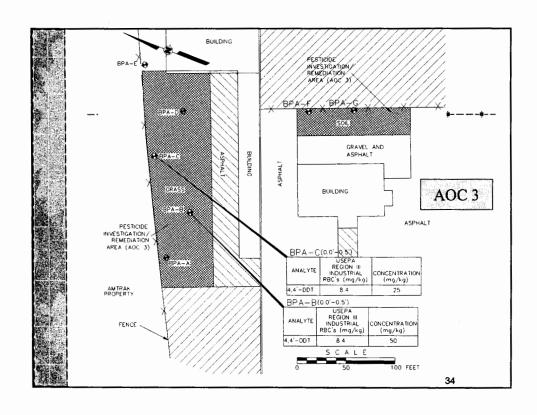


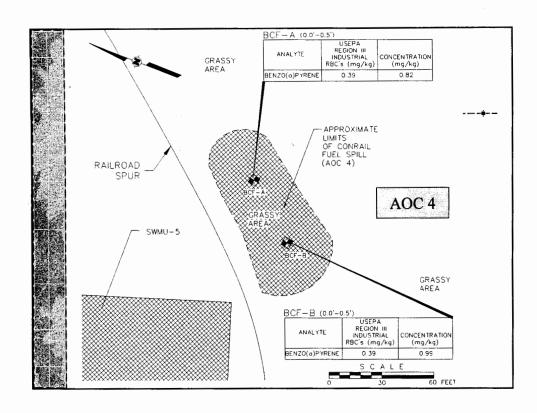


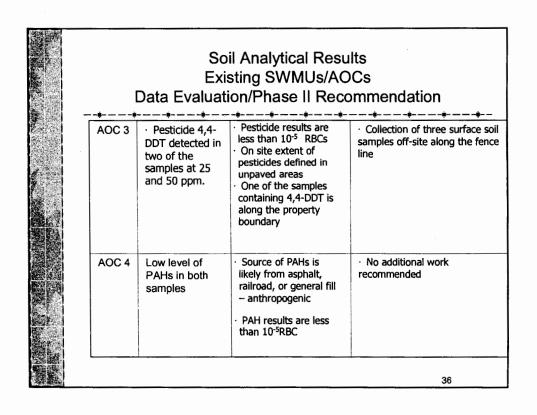




low levels (5.2 and 11 ppm) in two of the three samples ACC Arsenic levels are less than accepted cleanup levels Arsenic levels below background ACC Arsenic at a low level (4.7 ppm) in one of the two samples ACC Arsenic levels below 10-5 RBC Arsenic levels below 10-5 RBC Arsenic levels below background Arsenic levels below background Arsenic levels are		E	oil Analytical Reskisting SWMUs/Antion/Phase II Re	\OCs
low level (4.7 ppm) in one of the two samples below 10-5 RBC recommended recommended samples recommended recommend		low levels (5.2 and 11 ppm) in two of the	below 10 ⁻⁵ RBC . Arsenic levels are less than accepted cleanup levels . Arsenic levels	No additional work recommended
less than accepted cleanup levels	AOC 1	low level (4.7 ppm) in one of the two	below 10 ⁻⁵ RBC . Arsenic levels below background . Arsenic levels are less than accepted	No additional work recommended







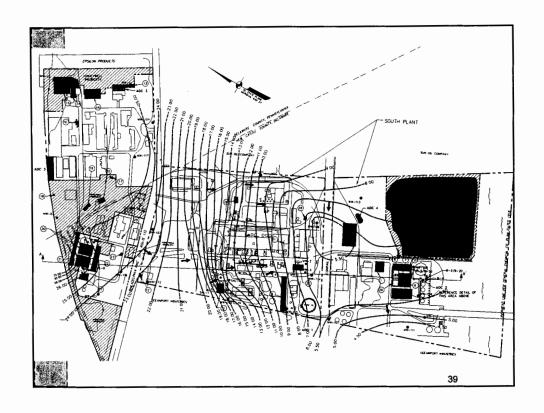
Groundwater Monitoring System

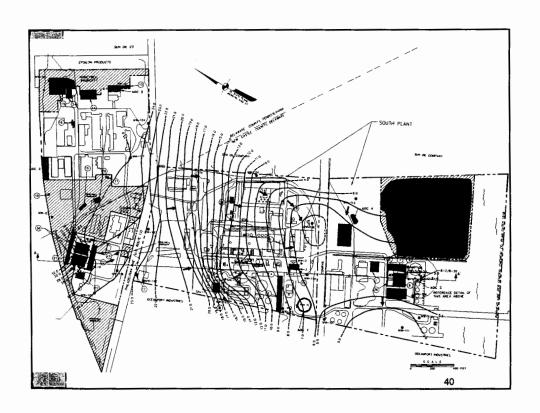
- ★ 16 Historical Groundwater Monitoring Wells
 - ◆ 5 Wells Former East/West Lagoons
 - ◆ 4 Wells Former Spent Acid Lagoons
 - ◆ 7 Wells Former Acid Spill Area
- # 17 New Wells Installed By GCC
- **¾** 4 New Wells Installed By Honeywell

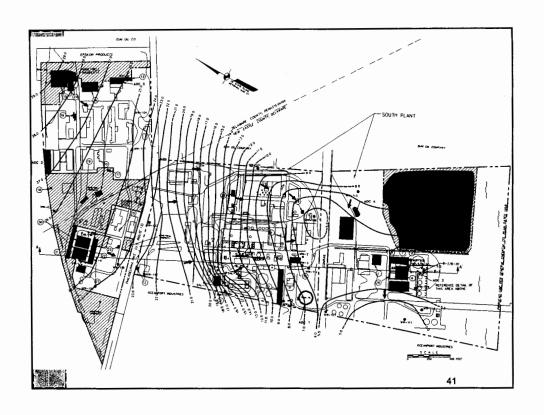
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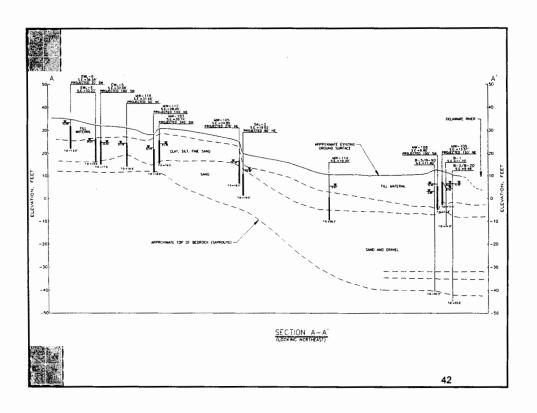
Groundwater Flow

- ★ Water levels measured three separate rounds similar flow pattern each round
- ★ General flow is from northeast to southwest, perpendicular to Delaware River
- ★ Relatively flat hydraulic gradient, more shallow as it approaches Delaware River
- ** Apparent deflection near river due to SWMU 9 and/or river system
- ★ Apparent mounding at Well EWL 8
- ₩ Upward hydraulic gradient along Delaware River









General Groundwater Quality

- ★ Groundwater quality relatively consistent between February and July Sampling Events
- * Arsenic was detected in Former Acid Spill Area wells along the Delaware River at similar concentrations to those found historically

43

General Groundwater Quality

- ★ Figure 17 provides summary of organic concentrations and arsenic in groundwater
- ★ Organic constituents were absent or at very low concentrations in existing and new shallow wells along the Delaware River
- ★ Organic constituents were essentially absent in deep well B-5D.

General Groundwater Quality

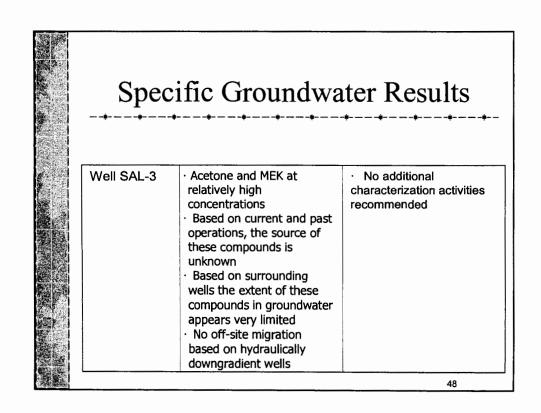
- ₩ One well contained LNAPL
- ☆ Groundwater quality data indicate minimal migration of constituents from North Plant to South Plant
- ★ Several wells on the South Plant had relatively high detections of specific VOCs

45

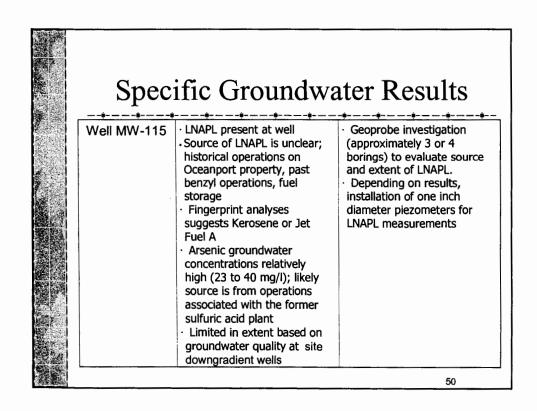
Specific Groundwater Results

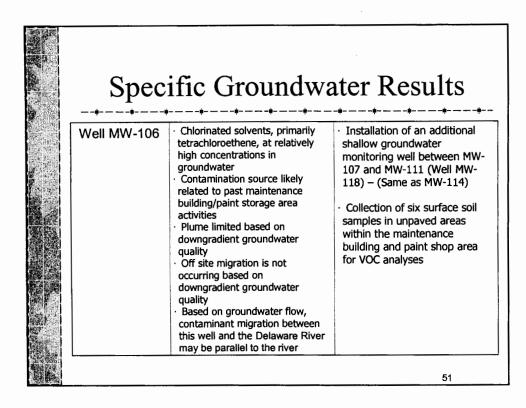
Well EWL-8	Need to further evaluate apparent mounding at Well EWL-8	· Additional groundwater investigations needed on Honeywell Property hydraulically upgradient of former east and west lagoon area
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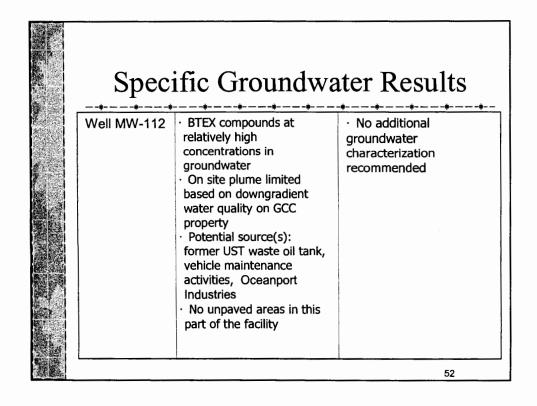
Specific Groundwater Results Well MW-102 · Distinctive suite of Collection of 4 to 6 organic compounds at groundwater samples this location; dissimilar using geoprobe techniques in the to those found at EWL-6 immediate area of Well and EWL-8 (carbon MW-102 to identify a tetrachloride, potential source chloroform, Groundwater samples nitrobenzene/toluene analyzed for VOCs, SVOC, compounds) and pesticides Source of these La teral extent to west compounds in this area contingent on additional is unknown information on Honeywell **Property**



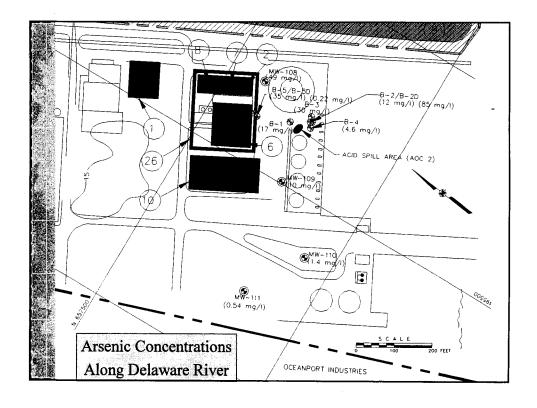
Specific Groundwater Results Well MW-114 Benzene concentrations Installation of an additional relatively high shallow groundwater monitoring well between Likely source is past benzyl operations located in the MW-107 and MW-111 (Well immediate vicinity of the MW-118) well Collection of six surface soil Extent of benzene plume samples in unpaved area of limited based on water past benzyl operations for VOC and SVOC analyses quality at downgradient wells No off site migration based on existing downgradient Based on groundwater flow, contaminant migration between this well and the Delaware River may be parallel to the river 49







Specific Groundwater Results Arsenic Arsenic at 50 to 100 ppm Review results of concentrations in levels in several shallow wells, decontamination activities in wells along similar to historical this area Delaware River concentrations Assumes monitoring well Lateral extent of higher information within/adjacent to SWMU 9 to evaluate SWMU as arsenic concentrations is defined on GCC property a potential source of higher Vertical extent of arsenic is arsenic concentrations limited based on concentrations Collection of 5 surface soil in Well 5D; support for upward samples in the unpaved area flow gradient along the river between the former sulfuric Potential sources: former acid acid storage tank area and spill area, AST acid storage SWMU 9 tank, or SWMU 9 SWMU 9 groundwater concentration of 100 ppm

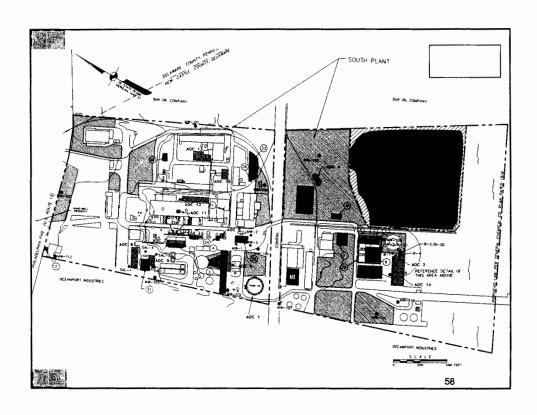


Specific Groundwater Results Appears regional based on · No additional activities Low levels of recommended pesticides in distribution · Low levels of pesticides in South Plant upgradient/background Groundwater wells Higher concentrations along Conrail line (except SAL-3) Primary pesticides are alpha/beta BHC 55

Spec	ific Groundwa	ater Results
Vertical Extent of Constituents	Depth to bedrock across the site will dictate whether the next deepest groundwater zone to be monitored is in bedrock or alluvium Well B-5D provides groundwater quality data at depth along the Delaware River; Well B-2D does not represent groundwater quality at depth in this area Groundwater elevation data indicates a fairly strong upward flow gradient along the river	Review available geotechnical drawings (Honeywell and General Chemical) for depth to bedrock information Honeywell to determine deep well locations on the North Plant GCC to install four deep wells in the south plant adjacent to Wells MW-110, MW-112, MW-115 and MW-118.
		56

Additional SWMU/AOC Definition – South Plant

- * Areas of potential waste management activities
- ★ Unpaved areas within former operational areas that based on visual inspection may have resulted in a release to soil
- **★ Sumps within former active AST areas**
- ★ Tanks without secondary containment with release history



Additional South Plant SWMUs/AOCs

/AOC	Description	Recommended Scope of Work	Analytical Program
SWMU 33	Former Spray Pond Area	Area is paved with asphalt. No additional work proposed	Not Applicable
SWMU	Former Waste Oil	Two surface soil samples adjacent to the pad, one sample from each of the two sides that are unpaved	Metals, VOCs,
34	Storage Pad		SVOCs, PCBs
SWMU	Former Hazardous	Four surface soil samples adjacent to pad, one sample from each side of the pad	Metals, VOCs,
35	Waste Storage Pad		SVOCs, PCBs

		ant
Debris Staging Area	Area is paved. No additional work proposed	Not Applicable
Former Sulfur Storage Tank Spill	Five surface soil samples within the unpaved portion of the former spill area	Metals, pH
Above Ground Fuel Storage Tank	The secondary containment area will be inspected following completion of facility decontamination activities. If unpaved, then four surface soil samples will be collected. If paved, then the containment area will be inspected for significant deterioration or cracking. If areas are identified, a maximum of four surface soil samples will be collected at	Metals, VOCs SVOCs
	Debris Staging Area Former Sulfur Storage Tank Spill Above Ground Fuel	Former Sulfur Storage Tank Spill Above Ground Fuel Storage Tank The secondary containment area will be inspected following completion of facility decontamination activities. If unpaved, then four surface soil samples will be collected. If paved, then the containment area will be inspected for significant deterioration or cracking. If areas are identified, a

			al South Plant IUs/AOCs	• •
	AOC 7	Former Sulfuric Acid Plant Area	Six surface soil samples will be collected in an unpaved area adjacent to former operations	Metals, pH
	AOC 8	Former Spent Sulfuric Acid Loading and Unloading Area Sump	Inspect sump following decontamination activities. If conditions indicate a potential significant release, then a surface soil sample will be collected beneath the sump	Metals, VOCs, SVOCs pH
	AOC 9	Former Spent Sulfuric Acid (Flammable) Storage Area Sump	Inspect sump following decontamination activities. If conditions indicate a potential significant release, then a surface soil sample will be collected beneath the sump	Metals, VOCs, SVOCs pH
618				31

AOC			
10	Former Acid Plant Area – Acid Storage Area Sumps A and B	Inspect sumps following decontamination activities. If conditions indicate a potential significant release, then a surface soil sample will be collected beneath the sump	Metals pH
AOC 11	Former Contact Sulfuric Acid Plant Area A – Sumps A and B	Inspect sumps following decontamination activities. If conditions indicate a potential significant release, then a surface soil sample will be collected beneath the sump	Metals pH
		11 Sulfuric Acid Plant Area A – Sumps A	AOC Former Contact Inspect sumps following decontamination activities. If conditions indicate a potential significant release, then a surface soil sample will be collected

		nal South Plant MUs/AOCs	
AOC 12	Former Contact Sulfuric Acid Plant Area B – Sumps A and B	Inspect sumps following decontamination activities. If conditions indicate a potential significant release, then a surface soil sample will be collected beneath the sump	Metals, pH
AOC 13	Former Photo Salts Plant Area Sumps A and B	Inspect sumps following decontamination activities. If conditions indicate a potential significant release, then a surface soil sample will be collected beneath the sump	Metals, pH
			63

		nal South Plant MUs/AOCs	
AOC 14	Former Sulfuric Acid Tank Storage Area Sump	Inspect sump following decontamination activities. If conditions indicate a potential significant release, then a surface soil sample will be collected beneath the sump	Metals pH
AOC 15	Former Acid Loading/Unloading Area Sump	Inspect sump following decontamination activities. If conditions indicate a potential significant release, then a surface soil sample will be collected beneath the sump	Metals pH

Summary of RFI Phase II Activities

- ★ Phase II Soil Activities (Existing SWMUs/AOCs)
 - ◆ SWMU 5 16 surface soil samples for As and Hg
 - ◆ SWMU 23 22 surface or subsurface soil samples for As, Hg and pesticides
 - ◆ AOC 1 3 surface soil sample for pesticides

65

Summary of RFI Phase II Activities

- ★ Phase II Soil Activities (New SWMUs/AOCs)
 - ◆ SWMU 34 2 surface soil samples for metals, VOCs, SVOCs, and PCBs
 - ◆ SWMU 35 4 surface soil samples for metals, VOCs, SVOCs, and PCBs
 - ◆ AOC 5 5 surface soil samples for metals, pH
 - ◆ AOC 7 6 surface soil samples for metals,
 VOCs, SVOCs and pH

Summary of RFI Phase II Activities

- ★ Soil Sampling Based on Groundwater Results
 - ◆ Well MW-114 Area 6 surface soil samples for VOC and SVOC analyses
 - ◆ Well MW-106 Area 6 surface soil samples for VOC analyses
 - ◆ Arsenic along River 5 surface soil samples for Arsenic analyses

67

Summary of RFI Phase II Activities

- Phase II Groundwater Activities
 - ◆ Well MW-102 4 to 6 groundwater samples using a geoprobe and analyses for VOC, SVOCs and pesticides
 - ◆ Well MW-115 3 to 4 geoprobe borings and installation of one-inch diameter piezometers
 - Well MW-114/106 Installation of additional shallow well (MW-118) and sampling for Appendix IX constituents
 - Deep Wells Installation of 4 deep wells in the South Plant and sampling for Appendix IX constituents

Summary of RFI Phase II Activities

■ Phase II Soil Activities (summary)

- ◆ Minimum of 75 soil samples at existing or new SWMU/AOCs, or monitoring well areas
- Additional soil samples possible based on field inspection following specific plant decommissioning activities

※ Phase II Groundwater Activities (summary)

- Installation of 1 shallow and 4 deep monitoring wells
- Drilling of 7 to 10 geoprobes
- Collection of 5 groundwater monitoring well samples
- Collection of 4 to 6 geoprobe groundwater samples